DOCUMENT RESUME

ED 318 719 SP 032 267

AUTHOR Seidenberg, Sharon I.; And Others
TITLE The Effects of Daily Physical Education on the Fitness Levels of Elementary School Students.
PUB DATE Dec 89
NOTE 20p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cardiovascular System; Elementary Education; *Elementary School Students; *Exercise; *Physical Activities; Physical Development; Physical Education; *Physical Fitness

ABSTRACT

To determine the status of students' physical fitness, a test battery consisting of pullups, curlups, shuttle run, and one-mile walk/run was administered to both sexes. The mean fitness test results of 9-year-old students from a school participating in physical education five times a week were compared to the mean fitness test results of 9-year-old students from other schools in the same school corporation in which students participated in physical education twice a week. The experimental group means were also compared to national means. The results showed that school means for both boys and girls on all four fitness tests were higher than the corporation means, showing significant differences in the pullup test. The school means were higher than the national means for both the pullup test for girls and the curlup test for boys. (Author)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 318 719

THE EFFECTS OF DAILY PHYSICAL EDUCATION ON THE FITNESS LEVELS OF ELEMENTARY SCHOOL STUDENTS

by

Sharon I. Seidenberg, Dawn M. Szymanski,

and David A. Gilman

Indiana State University

December, 1989

SP 032 267

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

D. Gilman

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ABSTRACT

This study investigated the impact of daily physical education on students' levels of fitness.

To determine student physical fitness, a test battery consisting of pullups, curlups, shuttle run and one mile walk/run was administered to both sexes. The means of fitness test results of nine year old students from a school participating in physical education five times a week was compared to the mean fitness results of nine year old students from other schools in the same school corporation in which students participated in physical education twice a week. The experimental group means were also compared to national means.

The results showed that school means for both boys and girls on all four fitness tests were higher than the corporation means, showing significant differences on the pullup test. The school means were higher than the national means for both the pullup test for girls and curlup test for boys.

BACKGROUND OF THE PROBLEM

The physical fitness and activity patterns of America's school children and youth are matters of national concern. Media pundits warn that our young children may be turning into flab and the fitness revolution has failed. As a profession, our basic charge is to care for the physical well being of the youth of this country, but the physical fitness of American youth is less than acceptable. This raises questions as to the quality of health and physical education programs.

Reports indicate that one out of every six American children is so unfit that he/she is classified as "physically underdeveloped" by the Standards of the President's Council on Physical Fitness and Sports (Johnson, 1985). The National Children and Youth Fitness Studies I and II, launched to determine how fit and active 5th through 12th grade students actually were, showed that American young people have become fatter since the 1960s (Ross & Gilbert, 1985, 1987). Estimates of overweight American children between the ages of 6 and 11 range from 13 to 20 percent (Johnson, 1985). Rupnow (1985) notes that each year students score lower on tests of upper body strength indicating that today's youth are also weaker. Recently, risk factors of coronary heart disease (CHD), such as hypertension, poor cardiovascular condition, high serum cholesteral levels, physical inactivity and elevated blood lipids have been identified in young children (East, Frazier, & Matney, 1989; Seefelt, 1984).

Physical inactivity is a lifestyle habit that has a direct tie to CHD mortality and morbidity and seems to contribute to the development of other CHD risk factors (Corbin, 1987). There is strong evidence that

the onset and rapid development of CHD can begin during youth and may eventually become irreversible. Obesity is associated with many risk factors of CHD, diabetes and stroke. The adult onset of obesity appears to be strongly related to poor physical activity patterns. Obese young people tend to be less active than their non obese peers. Physical inactivity can also contribute to the risk factors that promote back problems. In an emergency, an individual's ability to apply force with his/her upper body can mean the difference between a serious injury and escaping harm (AAHPERD, 1988).

Simons-Morton, O'Hara & Parcel (1987) acknowledge the relationship between various components of fitness and the risk of several kinds of health problems. Specifically, good muscular endurance, strength and flexibility are thought to be associated with reduced back problems (a leading medical complaint) and other musculoskeletal problems. Desirable body composition (a suitable balance of fat and lean body tissue) is associated with reduced risk of conditions such as diabetes. Research suggests that by engaging in regular exercise and physical activity that improves aerobic capacity, individuals can reduce many risk factors of CHD (AAHPRED, 1988).

Blair (1985) has provided data to show that fitness (the product) improves with regular exercise (the process). He carefully points out that health benefits are associated with both the product and the process.

Laporte, Dearwater, Cauley, Slemenda and Cook (1986), on the other hand, attribute health benefits more to regular exercise than to a state of fitness.

The need for physical activity in promoting a healthier and happier life is well documented (Wilmore, 1982); however, we do not know nearly

as much about the interrelationship of physical fitness and overall health in young children as we do about some other populations (Seefeldt, 1984). Corbin (1987) also established the need for additional research concerning the activity levels of children by noting that we know much more about the extent of activity among adults than children.

In support of a child's basic need for physical activity, Bailey (1976) concluded that physical activity is necessary to support normal growth in children. He also suggested that inactivity in youth can have a bearing on the functioning capacity of a mature adult and may relate directly to a number of adult problems. Further, he stated that motivation toward activity should be developed at an early age to ensure adult participation in activity, and that learning in the classroom may be enhanced and supported by participation in activities outside of the classroom.

Bailey's conclusions were supported by Hayes (1984) who found a strong connection between the decline in academic test scores and the sorry state of fitness and health among people. Rupnow (1985) also concluded that strength is vital to a child for motor fitness performance as well as for normal physiological functioning. Dynamic vitality, health and productivity for our population has been repeatedly associated with youth fitness. Testimonies strongly suggest that fit children are more likely to grow into fit and healthy adults, while unfit children, unless there is some significant intervention like an effective school physical education program, will continue to manifest those traits in adulthood (Hayes, 1984).

Year round participation in appropriate physical activity, variation in activities in a setting other than physical education coupled with receipt of physical activity through community organizations and

enrollment in and exposure to a wide variety of activities through activities in physical education are three aspects that have been shown by Ross & Gilbert (1985) to influence fitness. More specifically, Dotson & Ross (1985), in their national study, found that even though the nature of relationships changed among tests between sexes and across grade levels, aspects of the physical education program either directly or in combination with other factors accounted for performance differences.

Enrollment in physical education positively affected fitness but the nature of the program is of greater importance. Students exposed to a wide variety of activities perform better on physical fitness tests than students with more restricted exposure. With few exceptions, students scoring in the above average range report lower weekly activity time in physical education than students in other performance groups. Frequently, however, students at the optimal levels report less activity time per week for physical education than students in the acceptable range, suggesting that there may be a point of diminishing returns.

The importance of vigorous daily exercise for children and youth regardless of age, sex or physical capabilities or limitations has received much support (Hayes, 1984). However, only one in three children have no program at all (Wilmore, 1982; Johnson, 1985). Furthermore, Hayes (1984) claims that the physical education programs which do exist, particularly at the elementary school level, are totally inadequate. In a national youth fitness study, Ross, Dotson, & Gilbert (1985) found that rates of enrollment in physical education decline with each successive grade, as students apparently complete requirements and elect other courses of study.

Recognizing that the roots of many degenerative diseases are embedded in patterns of behavior developed through childhood the 1980 government report, Promotion Health/Preventing Disease: Objectives for the Nation, set as an objective that "by 1990, the portion of children and adolescents ages 10-17 participating regularly in appropriate physical activities, particularly cardiorespiratory fitness programs which can be carried into adulthood, should be greater than 90 percent (Ross, Dotson, & Gilbert, 1985). Hayes (1984) and Corbin (1987) both remind us that physical activity and fitness are major program goals which can be achieved in school through physical education. Seefeldt (1984) claims that initiating change in preschool and elementary schools could enhance childrens' present physical fitness and help them understand and achieve physical fitness in adulthood.

The purpose of the present study is to demonstrate the effects of a daily physical education program. If daily physical education influences students' fitness levels then the mean scores for students participating in this type of program should be higher than for those participating in physical education only two times a week.

STATEMENT OF THE PROBLEM

This study investigated the problem: How can educators get students' fitness levels to increase? More specifically, the study attempted to find answers to the question: Will daily physical education classes increase our students' level of fitness? It was hypothesized that the mean of fitness test results for students participating in physical education five times a week will be significantly higher than the means of students participating in physical education only twice a week.

METHODOLOGY

Sample Selection. The sample of this study consisted of nine year old students engaged in a daily physical education program at the University School in Terre Haute, Indiana. Terre Haute is a midwestern city having light industry. It has a population of approximately 61,125 and is the home of three colleges. It is comprised of a wide range of abilities with all income levels represented. There appears to be a racial mixture in this location. Students attending the University School are from various areas of the city; thus, providing us with a representative sample of the population of all fifth graders in the nation.

Equipment and Materials. The following equipment and materials were used to measure the physical fitness of the children who participated in the study.

1. Pullups: Metal or wooden bar approximately 1½ inches in diameter, a doorway, gym bar, a piece of pipe, or an inclined ladder.
2. Curlups: Stopwatch and mats.
3. Shuttle run: Two blocks (i.e. wood, erasers) approximate size 2" x 2" x 4", stopwatch, two parallel lines 30 feet apart.
4. Mile run: A track or any other flat, measured area, stopwatch, scorecards and pencils.

Students were given pre- and post-physical fitness tests. The emphasis was placed on aerobic endurance.

Groups. The Experimental Group consisted of approximately 60 nine year old students participating in a daily physical education group and program which fostered physical fitness through individualized exercise prescriptions. The Control Group consisted of nine year old students

from 17 other Vigo County schools participating in a physical education program two times a week with only a fitness post-test given. National fitness test means were also compared to means of the Experimental and Control Groups.

Tests. In order to determine students' physical fitness, a test battery consisting of the following items was administered to both sexes:

1. Pullups: To measure arm and shoulder girdle strength/endurance. The student begins by hanging from a bar using an overhand (palms outward) grip with his/her legs and arms fully extended. The feet should not contact the floor. From the hanging position, the student raises the body with the arms until the chin is positioned over the bar. The student is encouraged to repeat a correctly performed pullup as many times as possible with no time limit. The number of correctly executed pullups that are completed should then be recorded.

2. Curlups: To evaluate abdominal muscular strength and endurance by performing repeated situps. Students are instructed to lie on their back with knees flexed, feet on the floor, and heels between 12 and 18 inches from the buttocks. The arms are crossed on the chest with the hands on the opposite shoulders. The feet are held by partners to keep them in touch with the testing surface. On the command, "ready-go," the student curls to a sitting position, maintaining arm contact with the chest. The situp is completed when the elbows touch the thighs. The student then returns to the down position until the midback makes contact with the surface. Students are encouraged to repeat a correctly performed situp as many times as possible in the one minute time limit. Rest between situps is allowed in either the up or down position. The

number of correctly executed situps that are completed in 60 seconds then be recorded.

3. Shuttle run: To measure agility and to perform in the fastest time. Two parrallel lines are marked on the floor 30 feet apart. The width of a regulation volleyball court is a suitable area. The blocks of wood are placed behind one of the lines. Student starts from behind the other line. On the signal, "Ready? Go", the student runs to the blocks, picks one up, runs back to the starting line, places block behind line, runs back across starting line. Do not allow student to throw blocks across line. Record the student's score to the nearest tenth.

4. Mile run: To measure aerobic endurance and to perform in the fastest time possible. Students are instructed to run one mile in the fastest possible time. Emphasis should be placed on the development of the fastest pace that can be sustained across the full distance covered. Student should always warm up, and they should be encouraged to practice walking or running the required distance prior to the official day of the test. As they cross the finish line, elapsed time should be called to the participants (or their partners). Walking is permitted, but since the objective is to cover the distance in the shortest possible time, students should be encouraged to run at the fastest pace that can be for the one mile distance. Record the mile run in minutes and seconds.

Design. This study used a post test control groups design. The mean of fitness test results for those participating in physical education five times a week were compared with both the mean fitness test result of those students in area schools participating in physical education two times a week and with the national means for children of the same age.

Analysis. The tests were analyzed by computer and the mean scores were compared. One sample t-test were used to determine if the results showed significant differences at the .05 and .01 levels.

RESULTS

The results of this study are contained in Table 1, which summarizes the school, corporation and national means for both boys and girls for each fitness test - pullups, curlups, shuttle run and mile run - along with significance levels of the test for statistical significance. A visual representation of the data is also provided in Figures 1-4.

Table 1: Summary Statistics for Comparing Fitness Program with Local and National Population Means.

Test		School Means	Corporation Means	National Means	t-test Significance Levels School-Corporation	School-National
Pullups	Boys	2.57	1.47	2.00	0.01**	0.12
	Girls	0.52	0.00	0.00	0.005**	0.005**
Curlups	Boys	34.22	33.00	32.00	0.18	0.04*
	Girls	32.25	32.00	32.25	0.45	0.14
Shuttle Run	Boys	12.06	12.1	11.9	0.41	(0.18)
	Girls	12.55	12.6	12.5	0.38	(0.21)
Mile Run	Boys	10.97	11.12	10.3	0.24	(0.15)
	Girls	11.99	12.36	11.52	0.64	(0.80)

* Indicates statistical significance at .05 level.

** Indicates statistical significance at .01 level.

( ) Values in parentheses indicate that population mean was a "better score" than the mean of the experimental sample, although the differences were not significant at the .05 level.

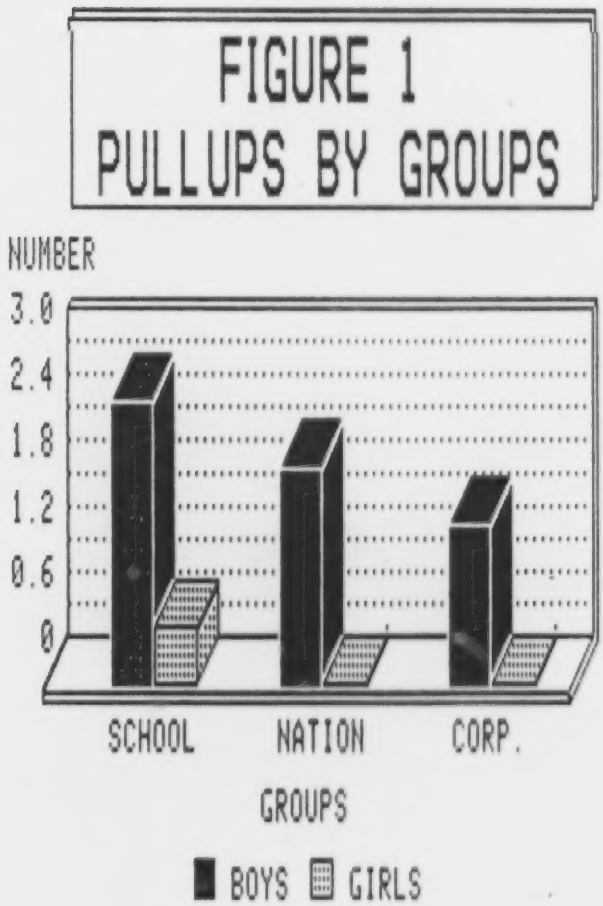
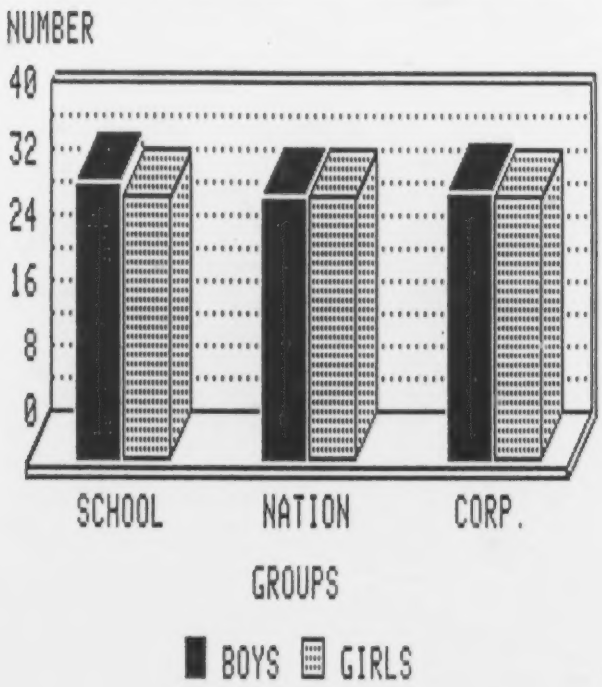


Figure 1 and the first section of Table I represent the data summaries for the Pullup Test. It can be noted that the mean score for boys (2.57) and for girls (0.52) were significantly higher than comparable means for boys (1.47) and girls (0.00) of the control group. The results were significant at the .01 level for both boys and girls.

The results for the girls were also significant at the .01 level when the Experimental Girls was compared to the national average for nine year old girls. Although the boys scored higher than the national average, the difference was not significant at the .o5 level.

FIGURE 2
CURLUPS BY GROUPS



The Curlups Test is presented in Figure 2 and also in the second part of Table I. Here, the boys' mean (34.22) was significantly higher than the national average for nine year old boys (32.00). Results were significant at the .05 level. No other comparisons were statistically significant at the .05 level. Running was not yet part of the curriculum at the time the tests were conducted.

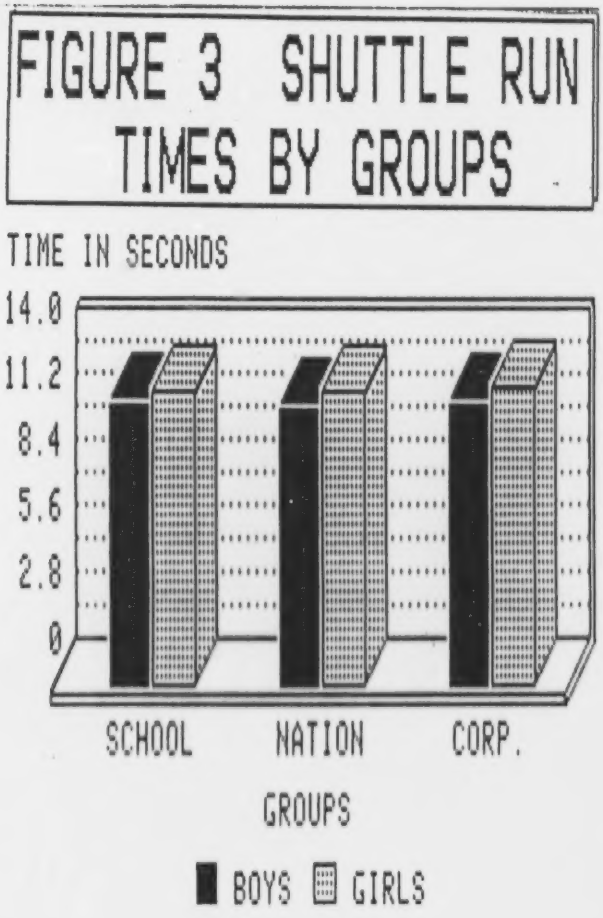
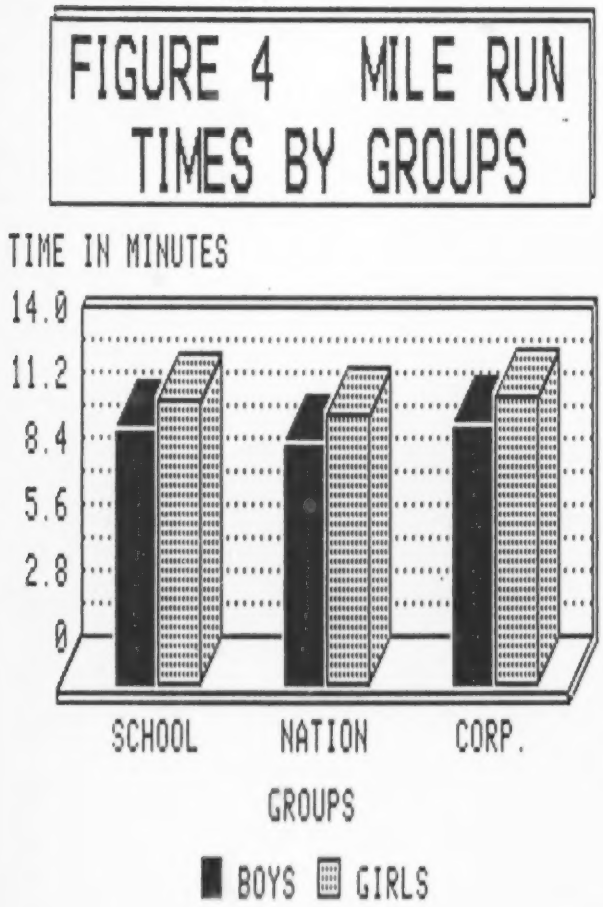


Figure 3 and the third part of Table I show the mean times in seconds for the Shuttle Run Test. There were no significant differences. It is noteworthy that both the Experimental and the Control Group scored lower than the national average. However, the differences were not large enough to be statistically significant for either boys or girls.



The times in minutes for the Mile Run Test is presented in Figure 4 and the final part of Table I. Similar results were obtained for the Mile Run Test as occurred in the Shuttle Run Test.

Specifically, although both the Experimental and Control Groups performed below the national average, no differences in running times were large enough to be statistically significant.

DISCUSSION, CONCLUSIONS, RECOMMENDATIONS

The results of this study show that fitness test results do improve with daily physical education. School means for both boys and girls on all four fitness tests were higher than the corporation means showing significant differences for boys and girls on the Pullups Test and significant differences for boys on the Curlups Test. The school means for both boys and girls were also higher than the national means showing significance on the Pullups Test for girls. The school mean for boys on the Curlups Test was significantly higher than the national mean but no significant difference was found for girls. Although no other differences were statistically significant at the .05 level, all measures showed improvement for the Experimental Sample as compared to the Corporation Mean. Although both the Experimental and Control Groups experienced slower times on the Shuttle and Mile Runs, these differences were not large enough to be statistically significant.

It is important to note that the daily physical education program at the experimental school had only been implemented for one year. Continued research must be done in following years not only to see if the trend continues, but also to see if greater differences will occur as the program takes hold.

Two improvements to be considered in further studies of this type are including a wider range of age groups and utilizing a more complete analysis of fitness measures. Two such measures are body composition to measure the degree of body fatness (Sum of tricep and calf skinfolds) and flexibility of lower back and hamstring muscles (Sit & Reach).

Research supports the need for physical activity, a daily exercise exercise program and schools taking a more active role in the fitness and health of their students, yet little research has been done on the actual impact of such attempts on students' fitness levels and the variables which affect them. It might be important to study such variables as class size, method of teacher instruction, quality of such instruction, type of program-physical development versus typical curriculum, class-time (actual activity time), variety of activities, and the extent to which family and community contribute to fitness and regular exercise.

Although it appears that daily physical education helps to improve the fitness levels of our youth, further research is needed before definite conclusions are reached. The relative lack of studies in this area leaves researchers with many options. We must begin to fill this gap of needed knowledge.

REFERENCES

American Alliance for Health, Physical Education, Recreation, and Dance (1988). Physical best. Reston, VA: Author.

Bailey, D. A. (1976). The growing child and in need for physical activity. In Avenson, J. & Andrew, G. M. (Eds.) Child in Sport and Physical Activity. Baltimore University. Panel Press, 81-93.

Blair, S. N. (1985). Physical activity leads to fitness and pays off. The Physician and Sports Medicine, 13, 153-157.

Corbin, C. B. (1987). Youth fitness, exercise and health: There is much to be done. Research Quarterly for Exercise and Sport, 58(4), 308-314.

Dotson, C. O. & Ross, J. G. (1985). The national children and youth fitness study: Relationships between activity patterns and fitness. Journal of Physical Education, Recreation and Dance, 56, 86-90.

East, W. B., Frazier, J. M. & Matney, L. E. (1989). Assessing the physical fitness of elementary school children. Journal of Physical Education, Recreation and Dance, 60(8), 54-56.

Hayes, A. (1984). Youth physical fitness hearings: An interim report from the President's council on physical fitness and sport. Journal of Physical Education, Recreation and Dance, 55, 33-35.

Johnson, M. W. (1985). Physical education: Fitness or fraud? Journal of Physical Education, Recreation and Dance, 51, 33-35.

Laport, R. E., Dearwater, S., Cauley, J. A., Slemenda, C., & Cook, T. (1985). Physical activity or cardiovascular fitness: Which is more important for health? The Physician and Sportsmedicine, 13, 145-150.

Ross, J. G., Dotson, C. O. & Gilbert, C. G. (1985). Are kids getting appropriate activity? Journal of Physical Eduation, Recreation and Dance, 56, 82-85.

Ross, J. G. & Gilbert, C. G. (1985). The national children and youth fitness study. A summary of findings. Journal of Physical Education, Recreation and Dance, 56, 45-50.

Ross, J. G. & Gilbert, C. G. (1987). The national children and youth fitness study II: A summary of findings. Journal of Physical Education, Recreation and Dance, 58(9), 51-56.

Rupnow, A. (1985). Upper body strength: Helping kids win the battle. Journal of Physical Education, Recreation and Dance, 56(10), 60-63.

Seefeldt, V. (1984). Physical fitness in preschool and elementary school aged children. Journal of Physical Education, Recreation and Dance, 54(11), 33-37.

Simons-Morton, B., O'Hara, N. M., & Parcel, G. (1987). Children and fitness: A public perspective. Research Quarterly for Exercise and Sport, 58(4), 61-66.

Wilmore, J. H. (1982). Objectives for the nation: Physical fitness and exercise. Journal of Physical Education, Recreation and Dance, 53(3), 41-43.